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RADIUM IN DISEASES OF THE NOSE AND THROAT.

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THE advent of any notable new remedy seems usually to be marked by three phases: The first in which it is considered a marvellous cure to supersede all the older orthodox remedies, and is puffed by the daily halfpenny papers. The second when the pendulum has swung the other way and it is condemned as useless or dangerous. The third when it finds its true place in clinical medicine or surgery. Radium is no exception to this rule, but it has been longer than most other remedies in having its merits or demerits found out. It has been before the medical public now for seven years, has been extolled by leaders of the profession in some instances, ignored or slighted in others, and is only now just beginning to fill its proper corner in therapeutics.

Information as to the clinical value of radium has thus been more slowly obtainable than that of most new remedies, the chief reason of which is its cost, and, perhaps, to a less degree the rivalry of the somewhat older and better established treatment by X rays. The action of the two differ from a clinical as well as from a scientific point of view in many respects, although they have points in common. Even were the clinical and therapeutical actions of the two the same, it is at present impossible to apply

X rays to the mucous membranes of cavities such as those of the nose, larynx, œsophagus, rectum, etc.

I have not enough experience of X rays, and also, I may say, of radium, to contrast the action of the two effectively, but it is now well known that clinically their curative action has some similarity in that they are both effectual in two important diseases, viz. lupus and rôdent ulcer.

I have devised a radium applicator resembling a small laryngeal mirror of oval shape ; radium paste is present instead of the mercury of the mirror, and instead of the glass a layer of varnish protects the paste. The shaft is made of pliable metal, enabling the instrument to be bent to adapt itself to follow the sinuosities of the nasal cavities, or be applied to the epiglottis or larynx itself ; in the latter case a handle is screwed on to the shaft, in the former the shaft only is used.

The paste contains one centigramme of radium bromide transformed into sulphate equal to $2\frac{1}{2}$ mgrm. of pure radium, the activity of which is represented by the makers at the figure 500,000. The salt can also be obtained in activity represented by the figures 50,000 and 10,000, but these degrees of activity would, I think, be inconveniently slow in their action. The head of the instrument has been made as narrow as possible to adapt itself to the often very narrow passages of the nasal cavities, but even so, I wish it could be narrower. Owing to the shield of metal on one side of the paste, the apparent activity of the radium is far greater on the varnished side if luminosity is any criterion. The intensity of the luminosity can be demonstrated in a pretty manner by placing a diamond on each side of the head of the instrument at equal distances—both diamonds glow with much more intensity than the radium itself, but the one on the varnished side is much brighter than the other. Three sets of radiations of different qualities and penetrating power have been demonstrated, known as the *alpha*, *beta* and *gamma* rays, in addition to a gaseous substance, the so-called emanations ; and the *gamma* rays are said to be capable of penetrating a 12in. steel plate or an inch of lead. I am indebted to Dr. Martin, of Messrs. Brady and Martin, for obtaining the radium, and having it mounted in the holder according to my ideas.

In order to keep the instrument clean in the moist cavities in which it has to be used, a piece of gutta-percha tissue is folded round the head, and fastened round the stem with cotton ; this may be more efficiently done with chloroform if care is taken that the chloroform does not penetrate to the varnish.

After keeping the radium some time the varnish is apt to rise in the form of a blister and increase the breadth of the head to an inconvenient degree. The instrument has had to be returned to Paris for this reason. The makers state that it is due to the radium emanations, and say that it is only necessary to prick the varnish with a needle for the blister to subside; in trying to do this, however, the varnish cracked across. It would be an uncomfortable event for both patient and surgeon were the paste to drop into a cavity like the post-nasal space and be swallowed; but the gutta-percha tissue guards against such a possibility.

My first experiment was to apply the radium to the healthy skin of my forearm for half-an-hour. (I may here say that the action of radium gives no sensation of any kind, either at the time of application or after). Nothing could be detected for the first thirty-six hours, but at the end of this time a very faint pinking of the surface corresponding to the area of the paste made its appearance. This increased in intensity for six weeks, when it was visible in a good light at a distance of 12 feet. At the end of ten weeks the effects of the application appeared to reach their maximum intensity. The colour then was of a somewhat purplish hue, and the surface was covered with a slight scaliness, which disappeared in a few weeks more. The colour gradually changed to a yellowy-brown, also becoming fainter, until now, at the end of one year, the place is almost invisible.

CASE 1.—This case is a most interesting and instructive one, as affording a demonstration of the convenient utility of radium in general, and (may I be excused for saying) my instrument in particular, showing how in a suitable case and tolerant patient, awkward places such as the post-nasal spaces, orifices of the Eustachian tubes, the epiglottis, and even the larynx may be reached and treated.

A lady, aged about thirty-five, had suffered from lupus vulgaris of the face since girlhood; originally treated by scraping, the advent of the X rays afforded a cure to this part of her trouble. One year ago she was recommended to see me by Dr. Taylor, of Chester-le-Street, on account of nasal discharge and obstruction, etc. Her nose was filled with crusts and pus, the removal of which caused bleeding and left a roughly granular surface extending over the whole of the surfaces within view in both nasal cavities. The condition caused great discomfort, especially during the night. The post-nasal space was in a like condition, and a granular overgrowth covered the mucous membranes surrounding the orifices of the Eustachian tubes. There was considerable loss of hearing and a history of intermittent discharges from both ears. The membranæ tympani were perforated. The epiglottis was reddened and also covered with granular overgrowth. The larynx generally was hyperæmic, and the upper portion of the

tracheal mucous membrane showed several distinct granules. Behind the left posterior pillar of the fauces there was a considerable mass of lupoid tissue. The radium was applied to a part of the diseased mucous membrane of the nasal cavities within sight. The time it was in contact with any one area of membrane varied from twenty minutes to one hour, several of these areas being usually treated at one sitting. In many parts the instrument was self-retaining, and the patient was able to read or sew. At other times, however, it was necessary for her to hold it in position with her elbow supported. Some of the areas required repeated applications. The orifices of the Eustachian tubes and post-nasal space generally were reached by passing the holder in the same manner as a Eustachian catheter. By using the post-nasal mirror the radium could be directed into accurate contact with the mouths of the Eustachian tubes or other part of the epi-pharynx. For treatment of the epiglottis the handle was screwed on to the stem, which was bent to a laryngeal curve, and after the laryngeal surface had been cocaineised the radium was gently placed in contact with this part, and the patient, closing the teeth and lips on the holder, was able with a little practice to retain it in this position for ten minutes at a time without removal. Closure of the mouth seems to lessen the tendency to gagging, as is also shown in the use of the new instrument—the pharyngoscope. In treating the larynx I was able after cocaineisation to keep the radium just anterior to the arytenoid region for a few minutes at a time, but I had to hold the instrument in position myself. The total amount of time during which the radium was in contact with some part of the mucous membranes just mentioned amounts to sixty hours, spread over a year of treatment. The results were as follows: The crusts in the nose began to diminish almost at once, and after a few hours' treatment extending over one month the mouth was kept closed during the night. The present condition is that the nostrils are about normally patent, but a small amount of scaling still takes place from a few parts of the surface. The membrane is paler and somewhat wizened-looking, and gives one the impression that the cilia have been destroyed. This I attribute to the action of the disease and not to the action of the radium, as the disease was very advanced before treatment was begun.

In this connection one has to remember that the mucous membrane of the nose differs from that of the skin in that if the germ-cells of the epidermis are destroyed scar tissue takes its place, which, apart from a somewhat altered appearance, does not matter very much from a functional standpoint. In the case of the mucous membrane, however, if the cilia are annihilated a condition of stasis is established, and the discharges from the sinuses are retained on the affected part. In other words, a condition analogous to atrophic rhinitis is present.

The epiglottis improved almost at once, which may have been due to the local action of the radium, but probably also I think to the improved nasal condition. The granular condition in the epi-pharynx required about twelve hours' treatment. The one unsatisfactory part in the case is the condition of the middle ears, which have a staphylococcic infection, and are much worse than they were a year ago. I am considering the question of applying a tiny piece of radium through the Eustachian catheter to the tube, and perhaps through the perforation in the membranes to the middle ears.

I have applied radium to three cases of ordinary perforation of the front of the nasal septum, the edges of which would not heal. In each case benefit seemed to result in the course of a week or two. All the cases were hospital ones, and disappeared from observation.

CASE 2.—A man was sent to me from Sir Rudolph Smith, of Stockton, with a specific tongue, which had a very painful ulcer on the dorsum. This was given a three-quarter-hour dose of radium. Three weeks later Sir R. Smith wrote: "I saw Mr. X— again yesterday and found the ulcer on the tongue practically healed. The cicatrix looked very healthy, and another important point was that ever since the application there has been an entire absence of pain. He states that even within a few minutes of the sitting being over, the pain ceased and has never returned; . . . so far I can only speak of the remedy as an unqualified success." Twelve weeks after the application he reported: "Mr. X—'s tongue continued to remain very well until a week or so ago, when it began to be a little sore, but he had been leaving off his medicine."

CASE 3.—An elderly man was seen with Dr. O'Neill, of Jarrow, suffering from an epitheliomatous growth at the base of the tongue, just in front of the epiglottis; a large mass of secondary glands was also present in the neck. Radium was applied to the primary growth, which was painful. I only used the radium as a placebo at the request of the patient's doctor, as the case was hopeless. The patient stated that the applications relieved the pain in the tongue, but complained bitterly of that in the neck.

CASE 4.—Dr. Coley asked me to see a case of ulceration with overgrowth involving nearly the whole of the lower half of the pinna. The lower part of the back of the pinna was a sloughing, foul surface with heaped-up edges; above this was a deep pouch discharging pus, the outer wall of which was formed of semi-necrotic skin. There was no enlargement of the lymphatic glands, but the history given was of three years' duration. My first inclination was to remove at least half of the pinna, as it looked so like epithelioma, but in the absence of glandular enlargement—which pointed rather to rodent ulcer—and in view of the marked deformity such an operation would cause I decided to try radium first. Radium was applied for a total period of ten hours during four weeks. Improvement was noticed within a week. Now the ulcer is more healthy-looking, the discharge is small in amount, the pinna generally less swollen, the overgrowth of new tissue much diminished, and the normal surrounding epithelium appears to be covering the diseased area from the margins. One is not yet quite happy about this case; it is, however, half healed, and, considering the previous duration of the disease and the short time it has been under treatment, it seems so far satisfactory.

On one occasion I allowed this patient to hold the radium to the back of the lobule of the ear herself; after an absence of three quarters of an hour I found her holding the radium over a portion of healthy skin behind the lobule, and an ulcer formed here. Four weeks have elapsed since this happened, and the ulcer is far from healed.

CASE 5.—That of a young woman with lupus of the end of the nose, spreading also into the mucous membrane of the nasal passages for a distance of about three quarters of an inch. The radium was applied for a total period of fourteen hours over the various parts of the diseased surface. So far as the skin condition is concerned one would have expected a more satisfactory result in the time from treatment with X rays. The result on the mucous membranes seems to have been

more satisfactory. X rays affect a larger area at a time than a small piece of radium. The result of an hour's application to the worst portion of the skin resulted in a heaping-up crust on this part in the course of a few days. [Since writing the paper this case has much improved.]

In conclusion, may I offer a few general remarks and opinions? In doing this it will be understood they are only given as impressions of a new treatment in which one has to feel one's way. Except where stated, the observations are deduced from the cases mentioned and not from those of other workers.

(1) In lupus of the nasal cavities and throat radium appears to offer more hope of cure than any other remedy known at the present time.

(2) The radium-holder I have devised is a useful instrument for the purpose, although the usual form of holder mounted as a signet ring is a more handy form for applications to the skin.

(3) The final effect of the radium is not seen until two or three months have elapsed after any one application.

(4) The usual length of application recommended, viz. ten to twenty minutes, is too short a time for most cases, unless a great many sittings are given. The 500,000 strength paste—the one used in these cases—is the strongest used for medical purposes, and with this a minimum time of half-an-hour seems safe; even with this strength several applications may be required to the same surface.

(5) The curative effect of the radium appears to die down gradually after any one application. In other words, if the dose is insufficient the disease is only kept in abeyance, and will re-assert itself. On the other hand, the effects of an overdose do not show themselves at the time, but not until about two weeks have elapsed.

(6) The signs of an overdose seem harder to detect in a mucous membrane than in the skin, or at least where the mucous membrane is much altered by disease.

(7) X-rays are probably more satisfactory for large areas of skin disease than radium, unless the surgeon is a millionaire of charitable disposition, or unless time is no object to both patient and surgeon.

(8) Radium appears to have the power of rapidly relieving pain in some forms of ulceration.

(9) Sufficient time has not elapsed in any of my cases to say whether treatment by radium results in a permanent cure.

[NOTE.—A surgeon asked me to try the effect of radium in a lady friend of his who had had a small hard prominent growth two lines in diameter just above the ciliary margin of the upper eyelid

for fifteen years. The eyeball was protected by lead-foil through a small hole in which the growth protruded. Three applications of three-quarters of an hour each, with intervals of one week, resulted in the growth entirely disappearing without ulceration or inflammation. This case is interesting, although not coming under "diseases of the nose and throat."]

THE VISUAL FIELDS IN ANTERIOR NASAL SINUSITIS.

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RECENTLY in this Journal¹ I described the visual field anomalies associated with suppuration in the spheno-ethmoid group of accessory sinuses. In this paper those changes observed in twenty-three cases occurring in disease of the fronto-antro-ethmoid group are recorded.²

Observations extending over two years have been made upon forty-four patients suffering from sinusitis, the posterior group (previously published) being affected in 33 per cent., the anterior in 47 per cent., and both groups in 20 per cent. In suspected sinusitis the visual fields were examined wherever possible, and with few exceptions before any nasal treatment was attempted. Investigations were again made at intervals during progress, but not on the same day of any therapeutic measure, nor in females during menstruation. The same size and colour test-objects were always used, excepting when any visual defect was extreme. The peripheral field was tested with 5.0 mm. squares of white, red and green, and central vision by 1.0 mm. squares of red and green. Perimetric records were always made in good diffuse daylight. If, in the presence of contraction of the colour fields alone there was any reason to suspect defective colour-perception, Holmgren's wools were used to elucidate this point. In anterior sinusitis the diagnosis of the nasal condition presents less difficulty than in the posterior group, and as most of the cases were ultimately confirmed by operation, details have only been mentioned where necessary. In this paper the term "centrally contracted" refers to a field which has the same form or shape as a normal field, only smaller; "generally

¹ JOURN. OF LARYNGOL., RHINOL., AND OTOL., May, 1911, p. 242.

² Two cases are also included in which there was posterior sinusitis as well, the anterior group, however, being more extensively affected.